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Title: Ethnicity-specific factors influencing childhood immunisation decisions among Black and Asian Minority ethnic groups in the UK: A systematic review of qualitative research

Corresponding author: Alice Forster, Health Behaviour Research Centre, UCL, Gower Street, London, WC1E 6BT, 0044 203 108 3293.

Authors

Alice S Forster, PhD ^a, Lauren Rockliffe, MSc ^a, Amanda J Chorley, MSc ^a, Laura AV Marlow, PhD ^a, Helen Bedford, PhD ^b, Samuel G Smith, PhD ^c, Jo Waller, PhD ^a

^a Health Behaviour Research Centre, UCL, Gower Street, London, WC1E 6BT, United Kingdom

^b Institute of Child Health, UCL, 30 Guilford Street, London, WC1N 1EH, United Kingdom

^c Wolfson Institute of Preventive Medicine, Queen Mary University of London, Charterhouse Square, London, EC1M 6BQ, United Kingdom

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What is already known on this subject?

Immunisation is a vital public health intervention that has reduced morbidity and mortality from disease.

Although uptake of immunisations in the United Kingdom is good in general, uptake among individuals from some Black and Asian Minority Ethnic (BAME) backgrounds is lower for some immunisations.

Previous reviews have explored the factors that affect parents' decisions to immunise a child, but have not considered whether ethnicity-specific factors influence the decisions of parents from BAME backgrounds.

What this study adds?

Our systematic review of qualitative research identified that factors related to ethnicity, namely religion, upbringing, migration and language, affect parents' immunisation decisions.

We also found that some parents' beliefs about biological differences between individuals from BAME backgrounds and the majority population in the UK affected their decisions, as well as the information they wanted to receive prior to making a decision.

Factors related to ethnicity should be considered when seeking to understand the immunisation decisions of parents from BAME backgrounds. Where possible, vaccination information should be targeted to address parents' ethnicity-specific concerns.

ABSTRACT

Background: Uptake of some childhood immunisations in the UK is lower among those from some Black and Asian Minority Ethnic (BAME) backgrounds. This systematic review of qualitative research sought to understand the factors that are associated with ethnicity that influence the immunisation decisions of parents from BAME backgrounds living in the UK.

Methods: Databases were searched on 2-Dec-2014 for studies published at any time using the terms “UK” and “vaccination” and “qualitative methods” (and variations of these). Included articles comprised participants who were parents from BAME backgrounds. Thematic synthesis methods were used to develop descriptive and higher-order themes. Themes specific to ethnicity and associated factors are reported.

Results: Eight papers were included in the review. Most participants were from Black (n=62) or Asian (n=38) backgrounds. Two ethnicity-related factors affected immunisation decisions. First, factors that are related to ethnicity itself (namely religion, upbringing and migration and language) affected parents’ perceived importance of immunisations, whether immunisations were permitted or culturally acceptable and their understanding of immunisation/the immunisation schedule. Secondly, perceived biological differences affected decision-making and demand for information.

Conclusions: Factors related to ethnicity must be considered when seeking to understand immunisation decisions among parents from BAME backgrounds. Where appropriate and feasible, vaccination information should be targeted to address beliefs about ethnic differences held by some individuals from some BAME backgrounds.

INTRODUCTION

In the United Kingdom (UK), the routine childhood programme offers immunisation against 17 diseases, starting when the infant is two months old.[1] Additional vaccines (such as BCG) are offered selectively from birth to high risk individuals. High uptake is crucial to the success of the programme, providing both direct protection to vaccinated individuals, and, if a sufficiently high proportion of the population is immunised, indirect protection to the unimmunised through herd immunity. While overall coverage of immunisations in the UK is very good [2, 3] there is evidence that uptake of some immunisations is lower among individuals from some Black and Asian Minority Ethnic (BAME) backgrounds.[4-12] While herd immunity will benefit the general population, where sub-populations live apart from the general population they may not be protected if they remain unimmunised. Individuals from some BAME backgrounds live in areas with high concentrations of individuals from their own ethnic group,[13-15] particularly in cities. Low uptake of immunisations makes individuals living in these ethnically dense areas more vulnerable to disease. In addition, unprotected individuals travelling to countries where infectious diseases remain prevalent may be at risk both of acquiring infection and subsequently importing it into the UK, and are vulnerable to infection acquired from unprotected family members visiting the UK from such countries. Although low immunisation uptake is often associated with deprivation,[6, 11] ethnic differences in uptake persist even after controlling for deprivation.[6, 7, 11, 16] A study of diphtheria immunisation coverage in London, found that immunisation uptake varied by ethnicity, but no relationship between deprivation and coverage for most ethnic groups (apart from White-British and 'Ethnicity not known' groups),[12] suggesting that ethnicity is important in understanding uptake of immunisation, independent of deprivation.

Ethnicity was defined by Bhopal in 2004 [17] as a '*multifaceted quality that refers to the group to which people belong, and/or are perceived to belong, as a result of certain shared characteristics, including geographical and ancestral origins, but particularly cultural traditions and languages*'. Bhopal states that ethnicity is different from race, nationality, religion, and migrant status, but can include facets of these factors. BAME groups in the UK are often considered to be those from non-White British backgrounds. However, ethnic groups are not stable [18] and change with the social context, and ethnic diversity in the UK is growing [19].

A number of reviews have provided frameworks to help us understand parents' immunisation decisions [for example 20, 21-23], but none has specifically considered parents from BAME backgrounds. In the present study we systematically reviewed the qualitative literature with

the aim of understanding the factors associated with ethnicity that influence the immunisation decisions of parents from BAME backgrounds living in the UK. While we can learn from the primary research studies conducted specifically with individuals from BAME backgrounds, research has also been conducted with general population samples that include individuals from BAME backgrounds, but do not comment on ethnicity. The present review allowed an exploration of the role of ethnicity hidden within articles whose focus was not ethnicity, as well as those whose focus was BAME groups. Lower uptake of immunisations among individuals from some minority groups is not a phenomenon limited to the UK [for example 24, 25, 26]. However, we focus solely on the UK for the present review as it is difficult to compare the experiences of BAME groups across countries as their history and migration experiences will vary considerably. Although BAME groups may be defined similarly in different countries, because of different patterns of immigration, they may not have the same composition. The proportion of individuals from different ethnic backgrounds also differs between countries. Appreciation of the factors related to ethnicity that are involved in immunisation decision-making among parents from BAME backgrounds will help facilitate the development of interventions that enable parents to make more informed immunisation decisions.

METHODS

A systematic review of qualitative studies was conducted to understand the factors related to ethnicity influencing childhood immunisation decisions of parents from BAME backgrounds living in the UK. The review focused on immunisations offered as part of the UK childhood immunisation programme.[1] BAME was defined as being not White English/Welsh/Scottish/Northern Irish/British based on 2011 census data which indicated that this is the largest ethnic group in the UK [27]¹. PsycINFO, MEDLINE, CINAHL plus, Embase, Social Policy and Practice and Web of Science were searched on 2-Dec-2014 using the terms 'vaccination', 'qualitative' and 'United Kingdom' (and variants of these terms; see supplementary material for full search terms). There were no date restrictions. We did not include 'ethnicity' as a search term as this was likely to miss articles that included participants from BAME backgrounds, but whose focus was not ethnicity. We included articles that were published in peer review journals, in English, if they reported qualitative findings (such as those from interviews, focus groups or free-text survey responses) of studies conducted with parents/guardians from BAME backgrounds. Where White British (i.e. White English/Welsh/Scottish/Northern Irish/British) and BAME parents were included in

¹ Papers including individuals identifying as Irish, Gypsy Traveller or any other White background were eligible for inclusion.

studies, we excluded papers where none of the results could be attributed to parents from BAME backgrounds specifically. We excluded letters, dissertations, book chapters, reviews and commentaries. We reviewed reference lists of included articles and conducted forward citation searching using Web of Science.

After combining the results of the six databases, AF removed duplicates and excluded articles if the title obviously did not meet inclusion criteria. Abstracts and then full texts were reviewed by AF/SS/LR/AC and excluded articles were checked by another researcher. We extracted data on the methods used in the studies and sample characteristics using a piloted Microsoft Excel form. Outcome data were participant quotes or authors' interpretation of qualitative data that had been reported in the results section of the article or abstract (imported into NVIVO [28]).

We used thematic synthesis to analyse the data, following the methods described by Thomas and Harden.[29] The aim of thematic synthesis is to generate new knowledge or conceptual innovations and provide findings that go beyond those of the primary studies. Thematic analysis is a qualitative analytical method, and borrows techniques from quantitative systematic review methods, affording a high level of rigour. First, text was coded line-by-line (or by thematic fragment) by AF, AC and LR (one third each) and descriptive themes developed through lengthy discussion conducted over three sessions. Analytical themes were then generated by discussion with AF, AC, LR, LM and JW until consensus on interpretation was reached. We used NVIVO to code and group data into themes.[28] We report findings that related specifically to ethnicity or associated factors (such as religion). Issues unrelated to ethnicity were raised in the data but are not discussed in the results (see supplementary material). We assessed study quality using the CASP tool.[30] Studies with scores of 0-4 had a high risk of bias, and 5-9 low risk. Findings are reported in line with PRISMA guidelines.[31] Quotes are presented detailing the lead author of the article and whether the quote came from a participant or author.

RESULTS

Summary of included articles

The search identified 934 articles (see Figure 1 for flow of inclusion/exclusion). In total eight articles were included comprising a total of 209 participants from BAME backgrounds (range: 1-64; see supplementary material for table of included studies and full references). One article included a specific BAME group, two included a BAME sample in general and five included BAME participants in a general population sample. Articles used interviews (n=5)

and/or focus groups (n=4). Data were most commonly analysed using thematic analysis (n=3; framework analysis=2, grounded theory=2, analytic deduction=1). All articles were rated as having low risk of bias. Five articles focused on MMR, two on immunisations in general and one on HPV.

--- INSERT FIGURE 1 HERE ---

There were 61 participants in the studies from Black/African/Caribbean/Black British backgrounds, 37 were from Asian/Asian British backgrounds and six were White non-British (other ethnicities included Chinese=1, Turkish=1, Mixed ethnicity=1, Eastern European=1²). Only three studies explicitly reported that participants self-reported their ethnicity. One article reported ethnic group and religion and included 7 Black Christians, 5 Asian Muslims, 4 Asian Hindus, 2 Black participants with no religion, 1 Asian Christian and 1 Black Muslim. Participants' religions in others studies included Islam, Hinduism and Christianity. Where migration data were available 12 participants were born in the UK and 31 were not. The languages spoken included English, Somali, Punjabi, Urdu and Gujarati. In two studies data were collected in English only, in four studies data were collected in English and other languages and two studies did not specify. Most participants were mothers.

Summary of findings

Ethnicity affected immunisation decisions in two ways. Firstly, factors related to ethnicity influenced parents' perceptions about immunisations and secondly, beliefs about biological ethnic differences altered parents' perceived susceptibility to disease and vaccine side-effects.

Factors related to ethnicity influence perceptions about immunisations

Religion

Parents' religion affected their perceptions of the importance of immunisations and whether immunisations were permitted. Some Asian mothers stated that their anti-preventive medicine beliefs were linked to their religion. Contrarily, some Somali, Hindu and Asian Hindu mothers described how their religion taught them to look after the health of their children and so influenced their decision to vaccinate.

² The total is not equal to 209 as one article reported using a mixed BAME sample, but did not provide a breakdown of participants' ethnicities.

'I do believe it [immunisations] ... reduce diseases. But God knows – he can bring the kids to be sick or not to be sick basically'. Tomlinson, participant comment.

'...In our religion it says whatever that's good for your health... just do it'. Tomlinson, participant comment.

Religious practices also affected whether parents believed their children were at risk of acquiring immunisation-preventable diseases. Some Asian Muslim and Black Christian parents discussing HPV immunisation (which protects against a sexually transmitted infection) stated that their daughters were not at risk of infection as their religion promotes abstinence from sex before marriage. However, other Asian Muslim parents opted to vaccinate against HPV as they believed that they could not control their children's behaviour.

'Coming from a Muslim background... we don't have sex before marriage for example, so your first experiences of these things are when you're married and you stay in a relationship... because of that reason I'd probably say no, I wouldn't bother with it with my two girls'. Marlow, participant comment.

Some Somali parents had concerns about the content of immunisations (gelatine) on religious grounds.

Upbringing and migration

Parents' upbringing played a role in their decision-making. Black Muslim and Black Christian mothers explained that their positive attitudes towards immunisation were a result of knowing about poor health in other countries. In addition, these mothers' experience of healthcare in other countries made them appreciate that free healthcare is not assured. Similarly, one Somali mother was influenced by the immunisation practices in her 'home' country and another described how conflict in her country of birth meant she did not have knowledge about immunisation. Some Somali parents' lack of exposure to immunisation-preventable diseases 'back home' reduced the perceived importance of unfamiliar immunisations.

'One mother believed that the immunisations against tuberculosis is the most important immunisation, as 'that's the only important one that they do back home'. Tomlinson, author and participant comment.

In one study, parents who had not grown up in the UK had inaccurate beliefs about the UK healthcare system. Some Somali mothers expressed concern that their child would not be

able to go to school without completing their childhood immunisations or there would be social consequences, but accepted this as part of the '*British system*'.

Language

Language issues made it difficult for some parents to get their children vaccinated. Parents who did not speak English were concerned their children would not get the right immunisation or would get an immunisation twice. Parents wanted information to be available in their mother tongue, although one article reported that participants also had difficulty reading information in their mother tongue. In one article parents who were unable to read English were shielded from adverse coverage of immunisations, as were parents who read Indian newspapers, which did not have such coverage and resulted in parents having fewer immunisation concerns.

'...the Gujarati group was unable to read English, and the Indian newspapers had little coverage of the MMR vaccination debate in the UK'. Mixer, author comment.

Beliefs about biological ethnic differences

Some parents' beliefs about immunisation were influenced by their beliefs about biological differences between themselves and the majority population in the UK or belief that the UK environment is different from their country of birth. These beliefs affected vaccination decisions in a number of ways and the information parents wanted prior to making a decision.

A few Somali, Black Christian and Black Caribbean mothers were concerned that their biology made their child more at risk of disease or immunisation side-effects. Somali parents were principally cautious of MMR vaccine for this reason, discussing concern about side-effects (developmental issues and autism). One parent considered Somali boys to be particularly at risk. Some Asian Christian mothers expressed anxiety that immunisation research is not ethnically heterogeneous.

'Everybody's body inside is different. You speak to white people you speak to Asian you speak to black, the color of our skin is all different, but is the inside of our bodies different? How are we inside? Do we all have the same mechanisms?' Marlow, participant comment.

Participants described the information they received about immunisation as limited because it did not acknowledge these differences. Many articles suggested that parents wanted

personalised information. African Caribbean and Somali mothers in particular wanted information that addressed the concerns of their specific community and that was supported by GPs from their community. A complaint raised by several women regarding meningitis immunisation was that leaflets could not depict a meningitis rash on Black skin.

DISCUSSION

This systematic review identified that concepts related to ethnicity and perceptions of ethnic differences affect immunisation decision-making among parents from BAME backgrounds living in the UK. Factors related to ethnicity, such as religion, upbringing and migration and language, affected parents' perceived importance of immunisations, whether immunisations were permitted or culturally acceptable and their understanding of immunisation/the immunisation schedule, which may have facilitated or inhibited immunisation. Beliefs about ethnic differences resulted in some parents being concerned about biological differences in risk of disease or immunisation side-effects or that the UK environment was riskier than their 'home' environment. Beliefs about ethnic differences caused parents to demand tailored information.

Ethnicity is a complex construct and its different facets and associated factors should be considered when seeking to understand the immunisation decisions of parents from BAME backgrounds. Most quantitative immunisation research categorises participants into a limited number of ethnic groups ('White', 'Black', 'Asian' or 'Other'; although ethnicity-focused research often measures ethnicity in a more nuanced way) and few qualitative studies in this review described their sample in terms of the different facets of ethnicity. Although religion is associated with ethnicity, it may be considered independently. Some of the perspectives detailed in this review of parents from BAME backgrounds may equally be expressed by religious non-BAME parents and this review does not allow us to assess the prevalence of such perspectives.

Some parents' beliefs about ethnic differences between them and the majority population affected their decision-making. Similar perceptions about biological differences at the individual-level have been found among parents regardless of ethnicity (Forster et al., in preparation). Vaccination information currently provided by programme co-ordinators across the world, typically seeks to be ethnically inclusive or ethnically neutral.[32-34] However, it appears that some parents would prefer to receive ethnicity-specific information that addresses the particular concerns of their ethnic group. Computer-tailored health

communications are effective at changing individuals' behaviour (although effect sizes are small), and are more effective than targeted or generic messages.[35] However, tailoring requires recipients to have had an individualised assessment before receiving the communication, which is unfeasible on a population level for immunisation. There is evidence that targeted health communications (those developed with a particular sub-population in mind, a more simplified version of tailored communications) are as effective as tailored communications when the information is a 'good fit' with the recipient.[36] Where appropriate and feasible, vaccination information should be targeted to address parents' beliefs that biological ethnic differences increase risk of vaccine-side effects. Intensive service-delivery interventions, particularly systematic call-recall systems, have also improved vaccine uptake in areas with an ethnically diverse population [37]. However, lower uptake among some ethnic groups remained in this study and interventions targeted at difficult to reach groups may be required to improve coverage, although will require significant development and trialling prior to implementation.

The review was limited by the range of ethnic labels used by the primary authors. It was often not clear whether participants' ethnicity was self-reported or assigned. The lack of diversity in individuals from different ethnic backgrounds means that we cannot draw conclusions about a particular ethnic group. We also cannot draw conclusions about whether parents with particular views are less likely to immunise their child, or choose certain vaccines but not others. While this review provides a better understanding of the experiences of some individuals from some BAME groups, it is important to note that individuals with the same ethnic background are not homogenous and do not share the same experiences, which can impact on health and socioeconomic position.[38-40] Within religions, scriptural passages that could apply to vaccines are not interpreted uniformly [41]. For these reasons, our findings are unlikely to be representative of all individuals from all BAME groups. The review identified many issues unrelated to ethnicity that have not been discussed here and are commonly expressed by parents in general. In interpreting these findings, one must consider ethnicity-specific issues alongside the common concerns about immunisation. Only eight articles were included in this review, suggesting that there is a need for more primary research. Most articles focused on MMR immunisation, which limits the extent to which we can generalise our findings to other immunisations and additional research should consider focusing on other vaccines in the childhood immunisation programme.

Immunisation decision-making among parents from BAME backgrounds is affected by religion, language and upbringing and migration, as well as beliefs about ethnic differences.

While there is a need for further primary research in this area, immunisation programme coordinators may be able to increase uptake of immunisations if their immunisation information is targeted to address ethnicity-specific concerns about immunisations alongside those that are expressed by parents in general. Interventions to increase uptake of immunisation, targeted at parents from BAME backgrounds, should be developed that take a multifaceted approach to ethnicity.

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COMPETING INTERESTS

None.

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LEGEND FOR FIGURES

Figure 1 – Flow diagram of included studies, adapted from Moher et al.[31]

CONTRIBUTORSHIP STATEMENT

AF conceived of this review with JW, LM and HB. Data were extracted by AF, LR, AC and SS and analysed by AF, LR, AC, JW and LM. AF drafted the manuscript and all authors contributed to the write up and interpretation of the study findings.

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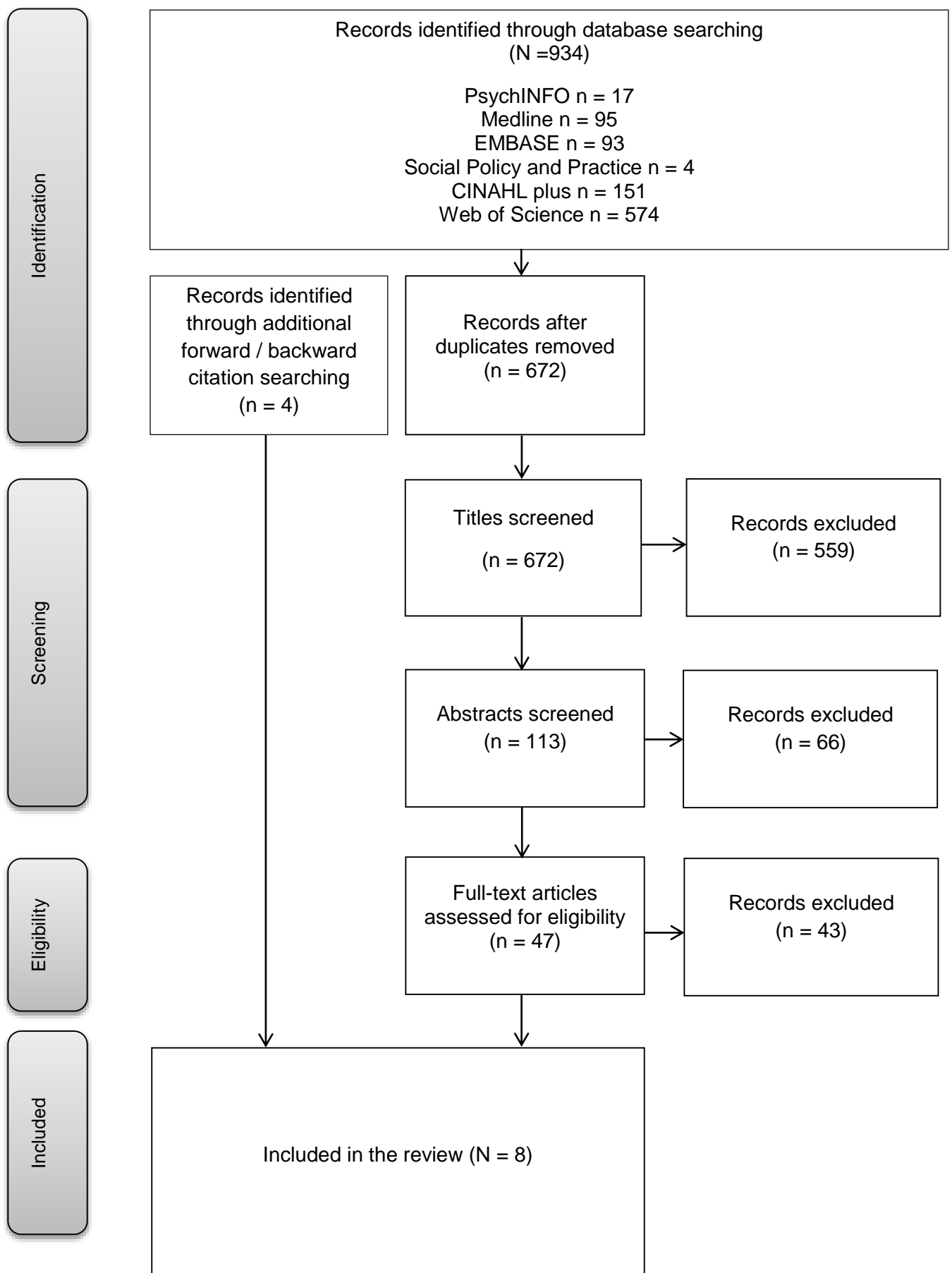
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Figure 1 – Flow diagram of included studies, adapted from [31]



Supplementary Material

Supplementary Material – Search terms by database

	PsycINFO	MEDLINE	Embase	Social Policy and Practice	CINAHL plus	Web of science
Vaccination	exp Immunization/ "vaccination*".ab,ti. "immuni?ation*".ab,ti.	exp Immunization/ "vaccination*".ab,ti. "immuni?ation*".ab,ti.	exp Immunization/ "vaccination*".ab,ti. "immuni?ation*".ab,ti.	exp Immunization/ "vaccination*".ab,ti. "immuni?ation*".ab,ti.	Exp Immunization/ "Immuni?ation*" "Vaccination*"	"Immuni?ation*" "Vaccination*"
Qualitative	exp Qualitative Research/ exp Interviews/ exp Observation Methods/ "interview*".ab,ti. "focus group*".ab,ti. "ethnogr*".ab,ti. exp Ethnography/ "thematic analysis".ab,ti. "grounded theory".ab,ti. "interpretative phenomenological analysis".ab,ti. "content analysis".ab,ti. "framework analysis".ab,ti.	exp Qualitative Research/ exp Interviews/ exp Observation Methods/ "interview*".ab,ti. "focus group*".ab,ti. "ethnogr*".ab,ti. exp Ethnography/ "thematic analysis".ab,ti. "grounded theory".ab,ti. "interpretative phenomenological analysis".ab,ti. "content analysis".ab,ti. "framework analysis".ab,ti.	exp Qualitative Research/ exp Interviews/ exp Observation Methods/ "interview*".ab,ti. "focus group*".ab,ti. "ethnogr*".ab,ti. exp Ethnography/ "thematic analysis".ab,ti. "grounded theory".ab,ti. "interpretative phenomenological analysis".ab,ti. "content analysis".ab,ti. "framework analysis".ab,ti.	exp Qualitative Research/ exp Interviews/ exp Observation Methods/ "interview*".ab,ti. "focus group*".ab,ti. "ethnogr*".ab,ti. exp Ethnography/ "thematic analysis".ab,ti. "grounded theory".ab,ti. "interpretative phenomenological analysis".ab,ti. "content analysis".ab,ti. "framework analysis".ab,ti.	exp Qualitative Studies/ exp Anthropology, Cultural/ exp Ethnographic Research/ exp Interviews/ exp Semi-structured Interview/ exp Structured Interview/ exp Focus Group/ exp Nonexperimental Studies/ exp Content Analysis/ exp Thematic Analysis/ exp Grounded Theory/ Qualitative* Anthropology* Ethnog* Interview* "Focus group"* Observation* "Content analysis" "Thematic analysis" "Grounded theory"	Qualitative* Interview* "Focus group"* Observat* Ethnog*Anthrop* "Content analysis" "Framework analysis" "Interpretative phenomenological analysis" "Grounded theory"
United Kingdom	"United Kingdom".ab,ti. "Great Britain".ab,ti. England.ab,ti. Scotland.ab,ti. Wales.ab,ti. "Northern Ireland".ab,ti.	"United Kingdom".ab,ti. "Great Britain".ab,ti. England.ab,ti. Scotland.ab,ti. Wales.ab,ti. "Northern Ireland".ab,ti.	"United Kingdom".ab,ti. "Great Britain".ab,ti. England.ab,ti. Scotland.ab,ti. Wales.ab,ti. "Northern Ireland".ab,ti.	"United Kingdom".ab,ti. "Great Britain".ab,ti. England.ab,ti. Scotland.ab,ti. Wales.ab,ti. "Northern Ireland".ab,ti.	United Kingdom/ England/ Great Britain/ Scotland/ Wales/ Northern Ireland/ "United Kingdom" "Great Britain" "England" "Northern Ireland" "Wales" "Scotland"	"United Kingdom" "Great Britain" "England" "Northern Ireland" "Wales" "Scotland"

Supplementary Material – Summary of findings that did not relate to ethnicity.

Issues unrelated to ethnicity were raised in the data and are not discussed in the results. These issues were those commonly expressed by parents in general with regard to immunisation decision-making (including parents being happy to comply with the recommended immunisation schedule, differing perceptions of responsibility to vaccinate, influence of personal experience and of others' advice, concerns about vaccines, perceptions that children's vulnerability to disease or vaccine side-effects is individualised and practical issues making vaccination difficult).

Supplementary Material - Characteristics of included articles

Lead author	Aim	Population of interest	Number of participants from BAME backgrounds; Gender	Ethnicity	Data collection period	Study Design	Analysis	Immunisation of interest	Risk of bias
Brown (2012)	To explore parents' MMR decision-making	Mothers planning to accept, postpone or decline the first MMR dose for their 11-36 month old children	16; Female	6; White non-British, 2; Black African, 2; Black British, 1; Chinese, 2 Asian British, 2; Asian, 1; Mixed British/African (Total sample size = 24) ^a	June 2008 to March 2009	Semi-structured interviews	Modified grounded theory	MMR	Low
Condon (2002)	To explore the attitudes of ethnic minority parents to preschool immunisations, particularly first MMR immunisation	Mothers of children aged 16 months to 3 years of Pakistani, Somali and Afro-Caribbean ethnicity	21; Female	11; Pakistani, 5; Somali, 5; Afro-Caribbean Languages spoken included English, Somali and Punjabi/Urdu Some participants were born in the UK, some were not	November 2000 to March 2001	Semi-structured interviews and focus groups	Thematic analysis	Childhood immunisation in general	Low
Hill (2013)	To ascertain factors influencing parental immunisation decision making	Parents of children who have received the MMR immunisation	3; Female	1; Ghanaian, 1; Turkish, 1; British Black Language spoken was English (Total sample size = 5) ^a	July 2010	Semi-structured interviews	Modified grounded theory	MMR	Low

Supplementary Material - Characteristics of included articles *(continued)*

Johnson (2014)	To explore mothers' engagement with advice around the combined MMR immunisation	Mothers of children aged 12-18 months	1; Female	1; Eastern European (Total sample size = 5) ^a	2011	Focus groups	Thematic analysis	MMR	Low
Marlow (2009)	To explore attitudes to HPV immunisation among Black and Asian mothers living in Britain	Black and Asian mothers living in Britain	20; Female	<i>Described by ethnic group, religion and migration status:</i> 6; Black Caribbean, 4; Black African, 3; Asian Indian, 3; Asian Pakistani, 1; Asian Bangladeshi, 3; Asian other 7; Black Christian, 1; Asian Christian, 4; Asian Hindu, 1; Black Muslim, 5; Asian Muslim, 2; Black no religion 12; Born in UK, 8; Not born in UK	April 2008 to August 2008	Interviews	Framework analysis	HPV	Low
Mixer (2007)	To explore ethnic differences in knowledge, attitudes and behaviour related to immunisation	Mothers from various ethnic backgrounds	24; Female	12; Afro-Caribbean, 12; Asian Languages spoken included English and Gujarati (Total sample size = 37) ^a	Not described	Focus groups	Thematic analysis	MMR	Low

Supplementary Material - Characteristics of included articles *(continued)*

Petts (2004)	To describe the information strategies that parents use to make sense of health risk issues	Parents of children with various MMR immunisation status'	64; Gender unknown ^b	At least 28 Asian Muslim mothers	February 2002 to July 2002	Focus groups	Analytic deduction	MMR	Low
Tomlinson (2013)	To explore the health beliefs of Somali women resident in the UK	Somali women resident in the UK with one child <5 years of age	23; Female	23; Somali Islam Languages spoken included English and Somali 23; Not born in UK	February 2012 to April 2012	Semi-structured interviews	Thematic analysis	Childhood immunisation in general	Low

^a We included articles that reported data from White British participants but these data were not included in the review. The 'total sample size' denotes the total study sample size where participants who were not from a BAME background were included in the article.

^b The 'total number of participants' column refers to the total number of participants in the article who were from a BAME background. Gender was not broken down by ethnicity in two articles which also included White British participants. For this reason, for these articles, we cannot report the gender of participants from BAME backgrounds.

Supplementary Material – References of articles included in the review

Brown KF, Long SJ, Ramsay M, Hudson MJ, Green J, Vincent CA, et al. U.K. parents' decision-making about measles-mumps-rubella (MMR) vaccine 10 years after the MMR-autism controversy: a qualitative analysis. *Vaccine* 2012;30(10):1855-1864.

Condon L. Maternal attitudes to preschool immunisations among ethnic minority groups. *Health Education Journal* 2002;61(2):180-189.

Hill MC, Cox CL. Influencing factors in MMR immunisation decision making. *British Journal of Nursing* 2013;22(15):893-898.

Johnson S, Capdevila R. 'That's just what's expected of you ... so you do it': Mothers discussions around choice and the MMR vaccination. *Psychology & Health* 2014;29(8):861-876.

Marlow LA, Wardle J, Waller J. Attitudes to HPV vaccination among ethnic minority mothers in the UK: an exploratory qualitative study. *Human Vaccines* 2009;5(2):105-110.

Mixer RE, Jamrozik K, Newsom D. Ethnicity as a correlate of the uptake of the first dose of mumps, measles and rubella vaccine. *Journal of Epidemiology & Community Health* 2007;61(9):797-801.

Petts J, Niemeyer S. Health risk communication and amplification: learning from the MMR vaccination controversy. *Health, Risk & Society* 2004;6(1):7-23.

Tomlinson N, Redwood S. Health beliefs about preschool immunisations: an exploration of the views of Somali women resident in the UK. *Diversity & Equality in Health & Care* 2013;10(2):101-113.

Supplementary Material – Inclusion and exclusion criteria

Types of studies

Primary research studies meeting the following criteria:

- reporting qualitative analysis of textual data (collected using focus groups, interviews, participant observation, free-text questionnaire responses);
- and indexed at any time in online databases and published in peer reviewed journals in English.

We excluded dissertation abstracts, book chapters, review articles and commentaries.

Types of participants

Parents or caregivers of children/adolescents living in the United Kingdom. Participants must have been making decisions about vaccinating a child (under 18 years old). Participants must be from a Black or Asian Minority Ethnic group (defined as being not White English/Welsh/Scottish/Northern Irish/British).